

On the remote Alaskan archipelago, scientists and Aleuts are trying to find the causes of a worrisome decline in fur seals

BY DOUG O'HARRA

A PUZZLE IN THE PRIBILOFS

GALE-FORCE WINDS from the Bering Sea's first fall storm scoured St. Paul Island in Alaska's Pribilofs, a stunning archipelago of ancient volcanoes and sweeping tundra 310 miles from the mainland. But amid the thundering ten-foot waves and shattering spray, hundreds of northern fur seals played with nimble abandon. Noses aloft, flippers up, they bobbed in the swells, as buoyant and nonchalant as birds on a thermal. They jostled, squirmed, slammed into each other. Individual seals skimmed down breaking waves like sleek brown torpedoes. Collapsing rollers revealed glistening brown animals, some of them females returning to the island to nurse after foraging 150 miles out to sea.

Onshore, the half mile of beach was alive with seals. Youngsters tossed strands of kelp and wrestled; cows lounged with bellies exposed, nursing their pups; bulls galumphed into grassy nooks and sprawled out to snooze. A ripe fishy odor saturated the cold wind, and whickering moans, grunts and bawls rose above the ocean's roar.

Vostochni Rookery, birthplace of 18,872 pups in 2004, home to a rowdy and tireless herd, was simply teeming, the largest concentration of northern fur seals in the United States. And yet, to a practiced eye, something was wrong.

Thousands of animals were missing.

DUSTIN JONES, the 24-year-old son of a sea lion hunter and part of a new generation of young Aleuts looking after the island for his tribe, stood bareheaded in the October chill and scanned Vostochni Rookery with binoculars and a spotting scope. The scene made him shake his head in disbelief. Grass was now sprouting in places pounded to hardpan by seals only a year or two earlier. Boulders once polished by the bodies of nursing females were gathering moss. Where 600-pound bulls and their harems had jammed the beach, hummocks grew brushy and thick.

Jones, who was raised on St. Paul and has a stocky build and wears an earring, serves as the Tanalix Amgignax (Island

Sentinel), a sort of ecosystem scout for the village's tribal government—patrolling beaches, watching animals, recording what he sees.

Jones took his first sea lion at age 12 with his father and spent countless weekends afoot with his grandfather, the island's magistrate and a popular tourist guide. To him, the scene at the rookery confirmed what his grandfather had been warning the local government about all those years. "He knew the seals were decreasing," Jones said.

The latest figures, based on seal counts taken in the animals' summer habitats on Pribilof beaches, would prove him right. A population that may have once numbered two million to three million in the 19th century—and saw a 20th-century high of 2.1 million in 1951—had slid to about 688,000. "This is just empty," Jones said, as he tucked away his spotting scope and prepared to drive to another beach. "It's unbelievable. They're usually just packed all the way up the grass."

CONSTITUTING at least two-thirds of the world's entire northern fur seal population, the Pribilof herd dominates an extraordinary collection of wildlife found on the archipelago and in the surrounding Bering Sea—10 species of seals, sea lions and walruses, 17 types of whales and dolphins, millions of nesting seabirds such as kittiwakes, murre and puffins—that makes the islands a sort of northern Galápagos.

A migratory species, the seals spend half the year foraging across the North Pacific Ocean, returning to local rookeries in the spring and summer to breed and raise their pups. "They've been leaving here alive, but they haven't been coming back," says Aquilina Lestenkof, a lifelong Pribilof resident and co-director of the ecosystem conservation office for the St. Paul Island tribal government. "Where are they going? What are they doing there? Are they getting enough to eat?"

Though the Pribilof seals are falling in number, they are

not in danger of extinction—at least not yet. In 1988, fur seals were listed as “depleted” under the federal Marine Mammal Protection Act. Since 1998, the number born on Pribilof beaches has dropped almost 6 percent a year, compounding a trend that has continued off and on for half a century. And they aren’t the only Alaska marine animals showing signs of drops. Steller’s sea lions have crashed by 80 percent since the 1970s; sea otters have almost disappeared from the Aleutians. Certain seabirds have plummeted too, and fish stocks are changing.

“Going back into the 1950s and ’60s, it’s all part of one larger decline that’s not really well understood,” says Rolf Ream, a zoologist at the National Marine Mammal Laboratory in Seattle. “There really is no reason that it should be continuing, and what’s really more shocking is that it hasn’t shown any sign of recovery. There are just very few ideas, and part of the problem is that we really don’t have a lot of the data we need.”

The northern fur seal, *Callorhinus ursinus*, is a cousin to eight other fur seal species found mainly in the Southern Hemisphere. Along with five types of sea lions—closely related animals with large bodies, coarser fur and more rounded snouts—this gregarious, harem-building marine predator belongs to the Otariidae family, thought to have diverged from a bearlike terrestrial ancestor about 25 million years ago. Unlike true seals, such as the harbor and ringed species, the Otariidae sport external ears and the ability to rotate hind flippers forward beneath their bodies so they can walk and climb on land. Females can live a quarter-century or more, while males rarely live beyond 16 or 17.

Like other herd-dwelling pinnipeds, fur seals follow a yearly cycle that begins in May when the 450- to 600-pound bulls return to the rookery to stake out prime breeding turf. The much smaller adult females return in June and usually within two days, give birth to a single 10- to 14-pound pup. Within a week, the adults mate. For nearly two months, the largest and most dominant bulls fight bloody, bellowing battles to defend their territories and keep other bulls away. During that time, the rookery takes on a complex structure that a researcher must carefully navigate in order to collect dead pups for study and to avoid the dangerous kings of the shore. By October, the pups begin to wean. About the same time, the seals start to scatter, with females, pups and juveniles migrating farthest, south of the Aleutian chain into the North Pacific.

Intelligent and at times aggressive, fur seals are agile on both sea and shore. But their most remarkable characteristic almost led to their demise: their dense waterproof underfur. The pursuit of this luxurious pelt by Russian and American traders in the 18th and 19th centuries twice pushed the seals to the edge of extinction. Between the early 1890s and 1909, an average of about 33,000 seals were killed each year in the

Bering Sea, most of them females foraging for food. The U.S. commercial harvest alone (probably in excess of \$200 million from the late 1860s to 1984) repaid Alaska’s \$7.2 million purchase price 28 times over.

Then, almost a century ago, estimates that only 200,000 to 300,000 fur seals remained in the world mobilized conservationists and inspired the first international effort by governments to protect marine life. In 1911, the United States, Great Britain (acting for Canada), Japan and Russia signed the Treaty for the Preservation and Protection of Fur Seals and Sea Otters. It prohibited killing seals at sea except by Indians, Aleuts and other aborigines using primitive weapons. Congress halted all onshore hunting of seals on the Pribilof Islands between 1912 and 1917 except for subsistence hunting by local Natives. The animals rebounded at a tremendous rate, and the U.S. government reinstated an annual harvest on land, which ranged from about 34,890 seals in 1918 to 95,000 in 1941.

That year, Japan pulled out of the treaty, arguing, in part, that the seals had grown so numerous that they had begun to harm Japanese fisheries, but in 1957 the four original signatories ratified a new treaty. At that time, U.S. biologists successfully argued that cutting the number of female seals would decrease the age when the animals first became pregnant, contributing to an increase in pup numbers and survival. About 300,000 Pribilof females were killed between 1956 and 1968 on land, and another 16,000 were taken at sea for research between 1958 and 1974.

But the herd didn’t respond as expected, and the population began to slide. Even after the female take ceased, numbers kept trending down, and government biologists ended the commercial harvests on St. George in 1973 and began a long-term program to monitor the island. A ferocious public campaign against killing the seals, combined with shrinking markets for their fur and the lapse of the 1957 treaty, would end the commercial harvest altogether in the Pribilofs by 1984. Native residents have since been allowed to kill a small number of juvenile male seals for food.

Once the industrial harvest ended, funding for the study of these mammals plummeted. In 2004, the National Marine Mammal Lab—charged with conducting a census of the population and monitoring its status—had virtually no budget for fur seal research. “We call it the ‘Pribilof Islands Program,’ but it’s just me handling the management end and Rolf [Ream] and his bunch from the lab doing the research,” says Dave Cormany, who administers the program from Anchorage with long visits to St. Paul.

SORTING OUT POSSIBLE EXPLANATIONS for the fur seal decline is as difficult as disentangling the fishing nets that often snag driftwood and entrap overcurious pups. Scientists have speculated that development of new harbors and industry on St. Paul may be disturbing seals. Competition with commercial fishing is another possibility, especially since

DOUG O’HARRA, a senior reporter for the Anchorage Daily News, has covered everything from melting glaciers to bear maulings to sled dog racing for the newspaper. This is his first story for SMITHSONIAN.

seals forage in many of the same areas as the pollock fleet. But commercial species like pollock remain high in the Bering Sea, and it's not clear how fishing might be taking food from the seals. Confounding it all, even as their numbers keep falling, the seals that do return to the Pribilofs appear healthy. "We're sitting up here and we're seeing animals, and they seem to be in decent condition, and I haven't seen a change in that," says Ream, who has been working in the Pribilofs for 16 seasons. "We don't see them in winter, but they tend to be showing up fine. I mean, there are a lot of fat pups out there."

Further complicating the mystery are other changes across the Bering Sea and the Gulf of Alaska. About 1976, Alaska's ocean underwent a "regime shift," in the latest turn of a long-running natural climate cycle called the Pacific Decadal Oscillation. After rapidly warming, a sea once swimming with fatty forage fish like herring and capelin eventually became dominated by pollock, Atka mackerel and flatfish. But seals didn't decline so dramatically during previous regime shifts. Why not? No one has a firm answer.

Humans also have forced changes across the region. Thousands of whales were slaughtered and fish stocks depleted in the decades following World War II. One theory argues that the loss of these whales ultimately forced killer whales to switch to smaller prey like seals, sea lions and otters. But many marine mammal biologists strongly disagree.

Ream and others speculate that something has been killing off or weakening juvenile seals during their first winters in the ocean. Or possibly females have been miscarrying the next generation during their eight months in the North Pacific Ocean, setting off a downward spiral that compounds each year with fewer maturing females available to breed. One scientist has speculated that there might be a food "bottleneck"—not enough fish of the right size and kind—for seals during their migration. But no one yet has come up with conclusive evidence for any of these theories.

"We've been dealing with these changes for 25 years," says Larry Mercurieff, a former St. Paul community leader and now deputy director of the Alaska Native Science Commission, an organization that oversees research and gathers observations by Natives, other residents and scientists. "I am concerned that we won't know what is going on with the fur seals until they decline beyond the point of recovery—since managers don't act without adequate scientific proof."

Karin Holser, the coordinator of the Pribilof Islands Stewardship Program, which recruits school kids and teenagers to clean up beaches, cut away plastic and rope from entangled seals, and help gather data, says she is frustrated also. "I see the seals crashing, and I don't see anything happening," says Holser. "How can you have a zero budget for seals when you can see them going down?"

The urgency appears to have caught on. The Pribilof Island Collaborative, a group of Natives, scientists, conservationists and fishing industry representatives, has been push-

ing for more money to investigate fur seals. And the Congressionally mandated North Pacific Research Board and the industry-funded Pollock Conservation Cooperative Research Center have asked scientists to submit proposals for research. Most important, millions of dollars in federal money previously limited to sea lions will also become available this year to investigate fur seals.

Another resource may come from tapping the insights of the Pribilof Aleuts; their lives have intertwined with fur seals for more than two centuries. They need to take a larger role in managing local populations, says Aquilina Lestenkof, who has become a leader in a movement to merge Native ways of seeing the environment with Western science. Her late father, the Very Rev. Michael Lestenkof, served for a generation as the village's American Orthodox priest and was widely respected as a man who knew a great deal about seals. He questioned the pruning of females in the 1950s and '60s because it contradicted traditional knowledge and practice. Remembering his misgivings, she wonders what knowledge of the ocean and its food died with those old, wise females. "There's more to know than we know," she says. "There's more than we understand right now."

SOME 525 PEOPLE live in the village of St. Paul, spread among 170 houses and apartment buildings on two facing hills, with the harbor, corporate offices and warehouses, and a school in between. Bikes lean unlocked against buildings and homes, and children play in shirt-sleeves outside the school. People greet strangers on foot with a cheerful wave.

Arctic foxes scramble up a dirt lane past a battered old house, a new Honda four-wheel all-terrain vehicle parked outside, electric guitar strains emerging from a second-floor window. There may be no telephone in the room at the King Eider Hotel, but you can catch CNN off the village's wireless Internet.

Listen closely, and you might hear the surf, but you will not hear the barking of dogs; they are prohibited on the island to protect the seals. So are rats. The tribe and city work with the U.S. Fish and Wildlife Service to maintain a network of traps, poison and patrols. The words "Keep St. Paul Rat Free" appear on signs in strategic locations across the island.

Dustin Jones guides the pickup truck over gravel roads past the fisheries service barracks, past the slopes of extinct volcanoes, past a field where heavy equipment plows under soil contaminated by decades-old fuel spills and leaks, past the airport. He drives eight miles or so toward the northeast end of the island, unlocking a gate and moving by an old cottage and a beautiful open-air chapel that marks one of the island's earliest village sites. It's time for another daily patrol.

Near an old lava flow that juts out into the Bering Sea, Jones scans the beach line for cavorting seals. A week earlier, he spied a male killer whale a couple of hundred yards out, holding offshore with its pod. The whale suddenly rushed the beach and dove, seals exploding to each side. It later sur-

faced with the other whales, then faded into the fog. Jones wrote it all down. "I'm looking for just anything," he says. Now Jones spots an immense light brown animal lounging in the surf, appearing like some mythic creature carved of stone. Then it raises its enormous, squashed face. "That's a big old sea lion," he exclaims, logging it. Over the course of several hours, Jones will visit four other rookeries on the island's gravel roads, noting, in turn, three lions hauled out on a rock, a pup tangled in green line, an off-white albino seal thought to be blind amid a sea of dark forms.

All that's missing are the masses of seals once known by his grandfather and all the elders before. "Something's happening," Jones says. "I'd like to know what the heck it is." ●

To Catch a Seal

Netting the agile, intelligent and aggressive animals for study requires stealth...and lots of fancy footwork

Clad in heavy rain gear, zoologist Rolf Ream peeked over the rim of a rock outcrop and watched the shifting, milling bodies across a 100-yard stretch of beach at Vostochni Rookery. Tonya Zeppelin, a biologist, crouched beside him, scanning the herd with binoculars. There, Zeppelin said. I see her.

A female seal with cellphone-size satellite and radio tags glued to her outer fur lay on a rock nursing a pup. She is one of 39 animals in a study to uncover more detail about where lactating females on St. Paul and St. George travel during foraging trips away from their newborn pups. Such research by Ream and others has already found, among other things, that adult males likely cue off currents to find their way across vast reaches of ocean, that seals from particular rookeries and islands forage in different areas, sometimes hundreds of miles apart. They've also discovered that young males range farther than lactating females and that pregnant females sometimes roam halfway across the North Pacific in their winter-long quest for food. Ream, in collaboration with another scientist, has also started a tracking study to compare the migration and condition of the declining herd on St. Paul with seals 200 miles to the south on Alaska's volcanic Bogoslof Island, whose tiny but thriving population may be increasing by more than 50 percent per season.

For now, though, how do three people snatch an agile seal with a cranky attitude and a teething baby? By sneaking close, capture nets in hand ready to dash or dive if charged. They're just a little more skittish in fall than summer, said Ream, who is a veteran of more than 100 seal captures. In July, you have to watch out, because they'll come after you.

There's something eerie about crouching close to the rookery: hundreds of pairs of eyes follow your every step. I think these guys are real smart, Ream would say later. You see these pups playing and playing chasing birds, throwing feathers, tugging on kelp. They seem like they have a sense of humor. Creeping through the herd sometimes takes on aspects of an elaborate dance. Ream explains that if you sense agitation, you need to squat and wait. As though on cue, seals about to stampede will often switch from near-panic to curiosity, then move closer with wide dark eyes and indignant barks. Sometimes, he says, it's difficult to know who's the real study subject.

Zeppelin began moving toward the seals, half crouching, clutching a large capture net. Another team member, Jim Thomason, was crawling over driftwood and boulders at the surf in a flanking maneuver. A massive bull suddenly charged Zeppelin, rising over her, head back and teeth out, bellowing. She crouched, head down. The bull calmed, looked her over and moved off.

A few yards farther, Zeppelin leapt up and dashed for the female, vaulting rocks and sidestepping seals. In moments she and Ream had carried the thrashing animal to a holding board

a hinged trap with a diamond-shaped opening to keep the seal in place to be examined. But the seal emerged from the net in unexpected fury, ducked the noose, and ran.

Seals' rear flippers are almost all webbed toes, powerfully hinged at the ankle, enabling the animals to scamper across broken ground with astonishing speed. But Ream cornered this one against a rock wall. For a moment, man and seal advanced and retreated like fencers. Finally, the zoologist lunged and dropped the noose, then dragged the animal back to the wooden board. Thomason shut the hinged trap over the seal's head.

With Zeppelin astride the animal's back, Thomason shaved about \$1,800 worth of tracking equipment from her fur and handed it to Ream. They weighed and measured her, splayed out her flippers, examined the muscle and fur where the tracking tag had been placed. She was four feet long. At 84 pounds, she had neither gained nor lost weight in the six weeks since Ream and his co-workers first captured her.

When they finished and flipped open the trap, the animal whirled, growling, facing down the humans for a few seconds before bolting for the rocks and her pup. She had some spunk, Ream said, laughing. A little bit of attitude.